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# GENERAL HABITAT RESTORATION GOALS

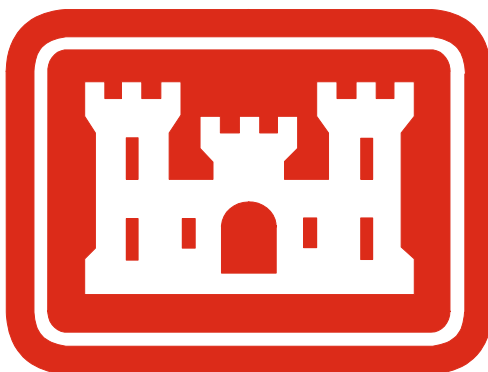
## Preparation of a Strategic Comprehensive Habitat Restoration Plan for the Onondaga Lake Watershed

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# SECTION 1

## INTRODUCTION

### 1.1 PROJECT DESCRIPTION

Parsons has been retained by the United States Army Corps of Engineers (USACE), Buffalo District to prepare a Strategic Comprehensive Habitat Restoration Plan (SCHRP) for the Onondaga Lake watershed. The intent of the plan is to evaluate the inherent capability of the Onondaga Lake watershed to support fish and wildlife and to develop alternative conceptual strategies for improving aquatic, wetland, floodplain and terrestrial habitats using sound ecological principles. This section provides an overview of the tasks that have been or will be performed to facilitate development of the SCHRP.

The first project task involved the preparation of an *Engineering & Design Quality Control Plan* (Parsons, July 2003). The purpose of that report was to provide quality assurance/quality control (QA/QC) procedures for the execution of the project scope of work.

The second project task involved the collection, compilation, review, and analysis of existing information (1970 to present) pertinent to the development of a SCHRP for the Onondaga Lake watershed. This task included identification of data gaps to be utilized as a caveat towards habitat restoration recommendations that will be presented in the SCHRP. The information gathered during the second task was presented in the *Outline of Findings and Data Gaps Report* (Parsons *et al.*, September 2003).

Task three describes the development of general restoration goals and objectives for aquatic, wetland, floodplain, and terrestrial habitat within the Onondaga Lake watershed based on findings of the literature review, input from the Habitat Restoration Team (HRT), and input from the public. Under this task, criteria were developed, which will be used during task four to identify impaired habitats within the watershed. Task three is the subject of this current report.

Task four will include an evaluation of existing habitat conditions within the watershed, identification of general types and relative degree of impairments, and development of alternative conceptual strategies for improving aquatic, wetland, floodplain, and terrestrial habitats. This information will be presented in the *Alternative Strategies Development Report*.

The final report, SCHRP, will incorporate the contents of each preceding report and will provide an overview of current habitat restoration projects, programs, and/or initiatives within the watershed. In addition, the SCHRP will evaluate the opportunities, limitations, and potential funding sources for implementing the restoration strategies developed in task four. The SCHRP will provide a holistic view of habitat conditions within the Onondaga Lake watershed and will serve as a resource document for future site-specific habitat restoration efforts. The SCHRP will provide a framework for establishing short- and long-term plans with regard to prioritizing habitat restoration projects.

## **1.2 OVERVIEW OF ONONDAGA LAKE WATERSHED**

The Onondaga Lake watershed encompasses approximately 248 square miles (642 square kilometers), is located almost entirely within Onondaga County, and includes rural, agricultural, and urban areas. The watershed includes six natural tributaries: Nine Mile Creek, Harbor Brook, Onondaga Creek, Ley Creek, Bloody Brook, and Sawmill Creek; and two constructed (i.e., man-made) tributaries: Tributary 5A and the East Flume. Onondaga Lake also receives influent from the Metropolitan Syracuse Treatment Plant located along the southeastern shore of the lake. The outlet of Onondaga Lake flows north to the Seneca River, which combines flow with the Oneida River to form the Oswego River, which ultimately discharges into Lake Ontario. The Onondaga Lake watershed and each major subwatershed are shown in Figure 1.

Figure 1: Onondaga Lake Watershed

## SECTION 2

### HABITAT RESTORATION GOALS AND OBJECTIVES

The purpose of this section is to identify habitat restoration goals and objectives and to provide an overview of the systematic approach developed to assess the present capability of habitats within the Onondaga Lake watershed to support fish and wildlife. The goals and objectives will be used to facilitate the development of alternative conceptual strategies to restore or improve impaired aquatic, wetland, floodplain, and terrestrial habitats within the Onondaga Lake watershed.

#### 2.1 HABITAT RESTORATION GOALS

General habitat restoration goals were developed for the Onondaga Lake watershed, specifically the watershed lands, tributaries and Onondaga Lake. These goals were developed based on information gathered during the literature review, the collective experience of the HRT members, and input from the public. Relevant guidance documents utilized during the development of these goals include: *Stream Corridor Restoration: Principles, Processes, and Practices* (Federal Agency Stream Restoration Working Group, 1998) and the *Rapid Watershed Planning Handbook: A Comprehensive Guide for Managing Urbanizing Watersheds* (Center for Watershed Protection, 1998). Habitat restoration goals developed for the Onondaga Lake watershed are presented below.

##### Watershed Lands and Tributaries

**Goal #1:** Restore and protect wetlands, floodplains, and terrestrial habitat

**Goal #2:** Restore and protect aquatic (in-stream) habitat

**Goal #3:** Restore and protect stream hydrology and channel processes

##### Onondaga Lake

**Goal #4:** Restore and protect wetlands, floodplains, and terrestrial habitat surrounding Onondaga Lake

**Goal #5:** Restore and protect aquatic habitat within Onondaga Lake

#### 2.2 HABITAT RESTORATION OBJECTIVES

Habitat restoration objectives were developed as an approach to achieve the habitat restoration goals. In addition, these objectives provide direction towards developing alternative strategies for habitat restoration. The habitat restoration objectives for the Onondaga Lake watershed are presented below.

## ***Watershed Lands and Tributaries***

### *Habitat Restoration Objectives for Goal #1:*

- A. Improve the functionality of impaired wetlands within the watershed, such that the number of functions and values supported by the wetlands are increased [based on the thirteen functions and values identified by the USACE ( 1995)]
- B. Restore floodplain hydrology and vegetative cover along adjacent tributaries where practical
- C. Improve the functionality of terrestrial habitat cover along riparian corridors such that the number of functions and values supported by the terrestrial cover are increased (based on the ten functions and values identified by the USACE (2000) for stream/lake buffer zones)
- D. Improve upland habitat structure and composition where practical
- E. Improve connectivity between fragmented habitats
- F. Restore native plant communities in disturbed wetland, floodplain, and terrestrial habitat utilizing Reschke (1990) as the reference document
- G. Reduce the overabundance and proliferation of invasive plant species
- H. Protect the habitat of threatened and endangered species and improve/expand the habitat where practical
- I. Encourage public support for implementation of protective measures along stream corridors on public and private lands

### *Habitat Restoration Objectives for Goal #2:*

- A. Improve the habitat for aquatic (e.g., fish, invertebrates) and semi-aquatic species (e.g., amphibians, reptiles)
- B. Improve water quality to support native plant and animal communities
- C. Reduce the introduction and proliferation of exotic plant and animal species or the overabundance of nuisance and invasive plant and animal species

### *Habitat Restoration Objectives for Goal #3:*

- A. Restore and stabilize areas of human induced bank instability
- B. Restore the natural stream flow regime

## ***Onondaga Lake***

### *Habitat Restoration Objectives for Goal #4:*

- A. Improve the functionality of impaired wetlands along the lake shore, such that the number of functions and values supported by the wetlands are increased [based on the thirteen functions and values identified by the USACE (1995)]
- B. Restore floodplain hydrology and vegetative cover along the lake shore where practical
- C. Improve the functionality of terrestrial habitat cover along the lake shore where practical, such that the number of functions and values supported by the terrestrial cover are increased [based on the ten functions and values identified by the USACE (2000) for stream/lake buffer zones]
- D. Improve the connectivity between fragmented habitats along the lake shore
- E. Restore native plant communities in disturbed wetland, floodplain and terrestrial habitats utilizing Reschke (1990) as the reference document
- F. Reduce the overabundance and proliferation of invasive plant species
- G. Protect the habitat of threatened and endangered species and improve/expand the habitat where practical
- H. Encourage public support for implementation of protective measures along public and private lands surrounding the lake

### *Habitat Restoration Objectives for Goal #5:*

- A. Improve the habitat for aquatic fauna (e.g., fish, invertebrates) and semi-aquatic fauna (e.g., amphibians, reptiles)
- B. Improve native aquatic flora (i.e., macrophyte communities)
- C. Improve water quality to support native plant and animal communities
- D. Reduce the introduction and proliferation of exotic plant and animal species or the overabundance of nuisance and invasive plant and animal species

## **2.3 OVERVIEW OF HABITAT EVALUATION APPROACH**

A systematic approach was developed to evaluate existing habitat conditions within the Onondaga Lake watershed and to assess the present capability of such habitats to support fish and wildlife. An overview of the approach is outlined below.

1. Identify existing habitat types within the Onondaga Lake watershed
2. Formulate habitat evaluation criteria

3. Evaluate existing habitat conditions
4. Identify impaired habitats
5. Develop alternative conceptual strategies for habitat restoration
6. Identify opportunities for restoration, potential constraints, and funding sources

The results of the evaluation will be presented in the *Alternative Strategies Development Report*, which is further described in Section 2.4. The remainder of this section provides a summary of the aforementioned approach.

The Onondaga Lake watershed is divided into five subwatersheds: Ninemile Creek, Onondaga Creek, Ley Creek, Harbor Brook, and Onondaga Lake (includes Sawmill Creek, Bloody Brook, Tributary 5A, and the East Flume) (Figure 1). Each sub-watershed may be further divided into stream segments and then qualitatively rated by examining area maps and utilizing existing data collected during the literature review. The United States Geological Survey (USGS) is currently developing boundaries for stream segments within each subwatershed as part of the Onondaga Lake Partnership (OLP) funded Surface Water-Watershed Modeling Project (personal communication, Mike Werth from QEA with Doug Freehafer from USGS, 2003). This segmentation scheme will be utilized during the establishment of stream segments to maintain consistency between projects.

Reschke (1990) will be used to classify habitat types within the Onondaga Lake watershed. Geographical Information System (GIS) map layers for land use/cover type will be interpreted and labeled according to Reschke's habitat classifications. The interpretation of the land use/cover type maps will be aided by supplemental information from other GIS layers including, though not limited to, National Wetland Inventory (NWI), USGS topography, Federal Emergency Management Agency (FEMA) floodplain, United States Department of Agriculture (USDA) soil, and watershed boundary maps. In addition to the GIS information, the Onondaga County Soil Survey manual (1973) and information gathered during the literature review will also be used to identify predominant habitat types within the watershed.

Ecological communities within the Onondaga Lake watershed will be divided into four general categories: aquatic, wetland, floodplain, and terrestrial. Each habitat type will be evaluated based on the criteria listed below and best professional judgement. During the evaluation process, the "types" of impairments within the watershed will be identified (e.g., channelization, sedimentation, lack of multiple ecotones, lack of water source, lack of appropriate floodplain) and the relative degree of impairment will be noted. Identification of "types" and the relative degree of habitat impairments within the watershed will facilitate the selection of alternative strategies to remedy such disturbances. The detailed evaluation and data gaps identified during the process will be presented in the *Alternative Strategies Development Report*. Data gaps will be used to indicate the need for future data collection efforts.

As mentioned above, criteria were developed to assess the relative condition of aquatic, wetland, floodplain, and terrestrial habitat in the Onondaga Lake watershed. These criteria are described below.

### Aquatic Habitat

1. Composition of fish communities will be evaluated by assessing size classes, their abundance and dominance per species or size class, and overall fish diversity.
2. Composition of invertebrate communities will be assessed by evaluating the presence of tolerant or intolerant species and overall invertebrate diversity.
3. The presence and abundance of non-native species will be used to evaluate the presence of exotic species.

### Terrestrial Habitat

The following criteria were selected from Redington (1996).

1. The presence of multiple vegetative layers (ground cover, shrubs, saplings, and trees) within a given area will be used to evaluate living space for organisms within a specific terrestrial habitat.
2. The presence and extent of multiple vegetated cover types (e.g., forest, shrubland, field, cropland) or ecotones within close proximity to each other will be used to evaluate the ability of the area to supply food, shelter, breeding/nesting, overwintering, and migratory resting areas for a variety of species.
3. The presence of water sources, which are suitable for wildlife drinking, breeding, egg-laying or rearing of young, within or near a habitat type will be used to evaluate habitat value.
4. The degree of urbanization will be used to assess habitat quality.
5. The degree of habitat fragmentation, as a result of urban development and major transportation routes, will be used to assess habitat quality. In general, continuous areas of non-urbanized terrain allow wildlife to move freely within the landscape. The presence of urban development or major transportation routes interrupts wildlife movement/dispersal and impairs habitat quality.

### Wetlands

The following criteria were selected from information contained on federal and state wetland maps, available GIS map layers, and various literature sources.

1. The number of different wetland types (ecotones) located in close proximity to each other will be used to assess the ability of the area to supply food, shelter, breeding/nesting, overwintering, and migratory resting areas for a variety of wetland dependent species.
2. NYSDEC wetland classifications will be used to evaluate wetland quality (functions/values). However, interpretation of the classifications must be tempered by an understanding of 6 NYCRR Chapter X Part 664 classification procedures.

3. Contamination of wetland substrate will be used to evaluate wildlife habitat value.
4. The presence of invasive species in a wetland or terrestrial habitat will be used as an indicator of habitat value. In general, high populations of invasive species will likely indicate a high degree of impairment to wildlife habitat.
5. The proximity of urbanized/commercial developments or transportation routes to wetlands will be used to assess habitat quality. In general, the closer or more interrupted a wetland habitat is by urban development, commercial enterprises, or transportation routes, the more impaired the wildlife habitat is expected to be.

### Floodplain

The following criteria were selected from the USDA Natural Resource Conservation Service (NRCS) (1998).

1. Presence of a 100-year floodplain located on both sides of a stream/lake suggests an unimpaired habitat (however, see criteria 2 and 3 below).
2. Presence of a 100-year floodplain covered with a vegetated canopy indicates an unimpaired habitat.
3. Presence of a 100-year floodplain with urbanized land cover suggests habitat impairment.
4. Presence of a 100-year floodplain located on only one side of the stream/lake, with lack of steep topography (e.g., an adjacent hill) indicates the floodplain should not be limited, and indicate a partially impaired habitat.
5. The absence of a floodplain on either side of the stream/lake (especially in an urbanized area), where no steep topography suggests the floodplain should be limited, would indicate severely impaired habitat.
6. The presence of steep slopes imply a floodplain should not be expected in a particular area and indicates an unimpaired habitat.

## **2.4 ALTERNATIVE STRATEGIES FOR HABITAT RESTORATION**

Alternative conceptual strategies and/or best management practices will be developed to restore or improve “types” of habitat impairments identified within the watershed. The alternative restoration strategies will be selected to fulfill the watershed habitat restoration goals and objectives. Evaluation of such strategies and prioritization of restoration projects will be incorporated into the SCHRP. In addition, the SCHRP will identify potential limitations and/or constraints (e.g., property ownership, non sustainability, lack of public acceptance), and potential funding sources that facilitate implementation of habitat restoration efforts.

## **SECTION 3**

### **SUMMARY**

Habitat restoration goals and objectives were developed for the Onondaga Lake watershed. In addition, a systematic approach was developed to evaluate current habitat conditions. The goals and objectives developed in this report will provide direction towards the formulation of alternative restoration strategies and/or management actions that may be used to achieve the stated habitat restoration goals. Alternative conceptual strategies capable of achieving habitat restoration objectives will be described in the next project task.

## SECTION 4

### REFERENCES

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- 6 NYCRR Chapter X Part 664, DEC Wetland classification procedures; available at <http://www.dec.state.ny.us/website/regs/664.htm>.

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## LIST OF ACRONYMS

A-E	Architect-Engineer
FEMA	Federal Emergency Management Agency
GIS	Geographic Information Systems
HRT	Habitat Restoration Team
NRCS	National Resource Conservation Service
NWI	National Wetland Inventory
NYSDEC	New York State Department of Environmental Conservation
OLP	Onondaga Lake Partnership
QA/QC	Quality Assurance/Quality Control
QEA	Quantitative Environmental Analysis
SCHRP	Strategic Comprehensive Habitat Restoration Plan
USACE	United States Army Corps of Engineers
USDA	United States Department of Agriculture
USGS	United States Geological Survey